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MAGNETIC CORE FOR COILS AND THE LIKE

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Fig. 1.

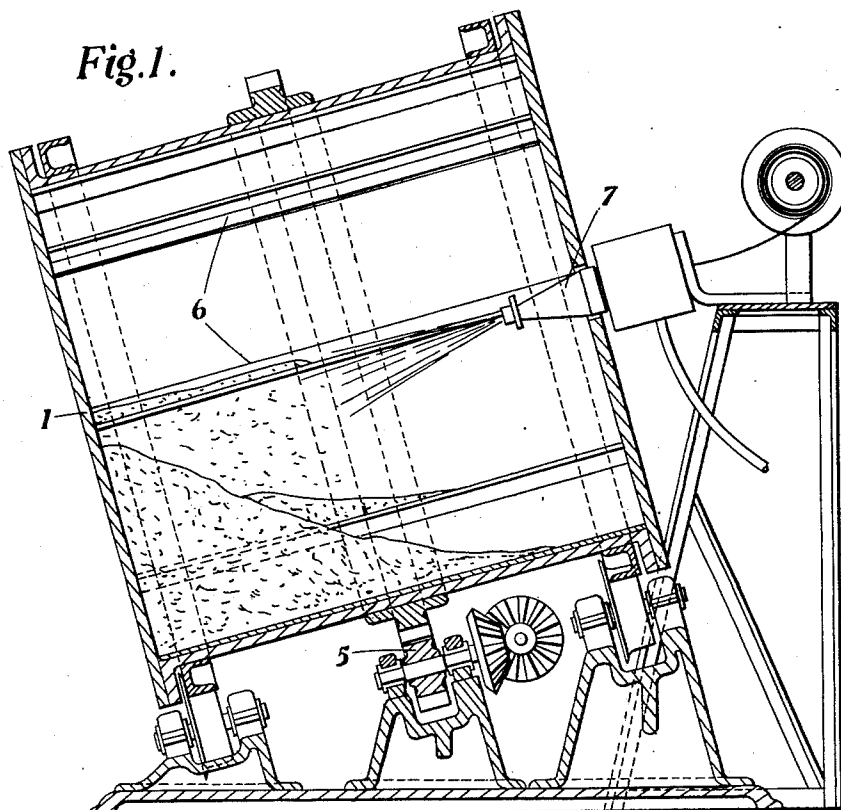
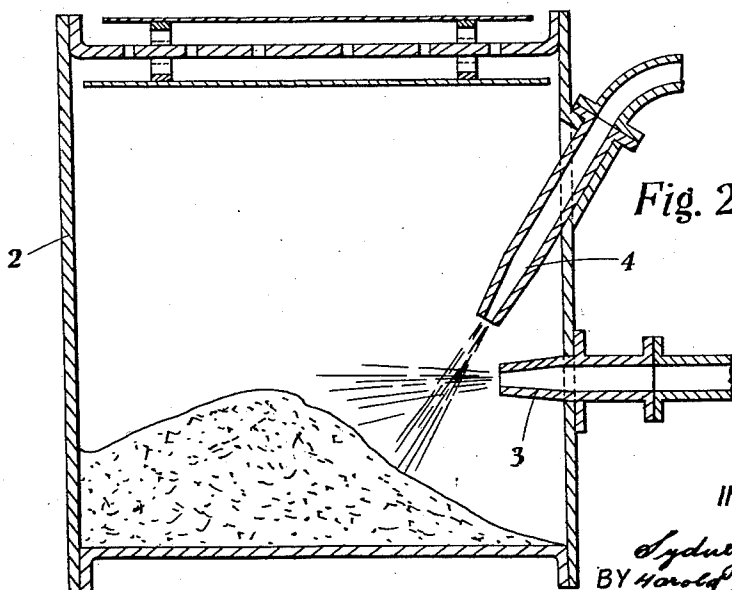


Fig. 2.



INVENTORS

Sydney Beckinsale

BY *Harold John A. Wood*

Cyrus, Stobbs, Parmelee & Blum
ATTORNEYS

UNITED STATES PATENT OFFICE

SYDNEY BECKINSALE AND HAROLD JOHN ALLCOCK, OF BELVEDERE, KENT, ENGLAND

MAGNETIC CORE FOR COILS AND THE LIKE

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This invention relates to cores made from powdered magnetic material. Such cores are chiefly used for loading coils for telephone lines and for transformers for currents of audible frequencies. In such cores it has been recognized as desirable to separate from each other electrically the particles of magnetic material. This has been done by coating the magnetic particles or by mixing them with particles of other materials, frequently using a binder to hold the mixture or coated particles together.

In accordance with the present invention we utilize as the separating material magnesium hydroxide which may be applied either as a coating or as particles mixed with the magnetic particles. In either case the hydroxide is obtained by applying magnesium to the magnetic material and treating the magnesium after application with steam at an appropriate temperature and pressure to convert it into hydroxide.

In producing a coating on the finely divided magnetic material this is passed through a region into which magnesium is introduced in a vapourized condition, for instance, by spraying. The magnesium is deposited as a thin coating on the iron and may be subsequently converted to magnesium hydroxide while adhering to the iron.

When applying the separating material as a mixture the magnesium is powdered to a definitely greater fineness than the magnetic material so that when the mixture is made up the magnesium will coat the iron.

The steam heat treatment may be carried out either before or after compression of the powder to form the core. This treatment consists in cooking the magnetic material with the magnesium in a steam atmosphere at raised temperature and pressure. The actual temperature and pressure depend upon the amount of magnesium present and upon other matters such as the shape and dimensions of the core when treatment is given after moulding. Pressures of between thirty and eighty pounds per square inch above atmosphere with temperatures of from 250 to 300° F. have been found to be suitable. Treatment before moulding is advan-

tageous for several reasons. It permits the agitation of the powder which may be employed to facilitate the action. If treatment is carried out after moulding it may be desirable to provide against the disadvantageous results of the slight increase in volume which takes place in changing from magnesium to magnesium hydroxide. This may be taken care of by placing the cores in close fitting containers during heat treatment, provision being made of course for the entry of the steam into the containers.

The accompanying diagrammatic drawings show two pieces of apparatus which may be used for the coating processes.

Figure 1 shows in section a rotary apparatus, and

Figure 2 shows in section a stationary apparatus.

In using the method of coating with vapourized magnesium we prefer to spray this into a chamber in which the iron or iron alloy dust is kept in a state of violent agitation. This may be a rotating rumblor 1 (Figure 1) or a chamber 2 (Figure 2) into which the iron or iron alloy dust is blown by a jet 3 in a stream against which the jet 4 causes a stream of magnesium vapour to impinge.

With the second arrangement it may be necessary, in order to obtain a complete coating, that the iron or alloy particles should be passed through the chamber twice; that is to say, the iron dust and magnesium vapour are first admitted into the container in two impinging streams and subsequently the partially coated dust is removed from the chamber and sent in again through the nozzle 3 through which the iron dust entered at the first treatment, a further supply of magnesium vapour being simultaneously admitted through its nozzle 4.

With the arrangement shown in Figure 1 the iron particles are placed in the rumblor 1 which is rotated in the usual manner, for instance, by gearing 5, so as to carry the iron particles to the upper part of the chamber by means of the blades 6 and by this means throw the particles into the central part of the chamber. The magnesium vapour is pro-

jected in a jet into this place by a spraying pistol 7 of known type and the vapour is by this means brought into close contact with the separate particles of iron and a complete coating produced.

Somewhat similar procedures may be followed in the method of coating by mixing. A rumbler may, for instance, be used but it is not necessary to send in the powdered magnesium in the form of a jet. It may be placed in the rumbler at the commencement of the operation with the magnetic dust and the two materials agitated together by the rotation of the rumbler.

When using the method in which two streams of material impinge on each other for powdered magnesium the procedure will be the same as that described for magnesium vapour.

The powdered materials may be blown into the chambers by means of jets of air or by other gas which is inert in the sense that it does not produce any disadvantageous chemical or physical effect upon the materials.

If the coated dust is to be treated before pressing, it should be placed in an autoclave and subjected to temperature and pressure by admitting steam. In this process, the magnesium will turn to magnesium hydroxide and in this form will still remain firmly adhering to the iron dust.

In making up the powder for moulding, either before or after heat treatment, it may be advantageous to use a small quantity of binder, for instance, up to about 3% of natural or synthetic resin, lac, gum or other suitable binding material. This binder is preferably applied by dissolving it in methylated spirit or other suitable solvent and mixing with the dust, preferably in a masticator, so that all particles of the dust are completely and uniformly coated. The solvent is driven off during the mastication process, leaving a thin coating of the binder on each separate particle. This method of mixing has been found to prevent caking.

The core is made up from the dust by pressing in a mould in known manner.

In the case of cores made up with coated iron dust, where the coating has not been heat treated before the application of the binder, the core is now placed in a suitable container, and the container, complete with core, is placed in an autoclave and subjected to temperature and pressure by the admission of steam. The time taken in this process will depend upon the size and proportions of the core being dealt with.

What we claim as our invention and desire to secure by Letters Patent is:—

1. A magnetic core comprising compressed, powdered magnetic material and separating material in which the separating material is magnesium hydroxide.

2. A magnetic core comprising compressed,

finely divided magnetic material the particles of which are coated with magnesium hydroxide.

3. A process of manufacture of magnetic cores comprising applying magnesium to powdered magnetic material and subsequently treating the magnesium with steam at an appropriate temperature and pressure to convert it into hydroxide.

4. A process of manufacture of magnetic cores comprising spraying magnesium vapour on to powdered magnetic material and subsequently treating this material with steam at an appropriate temperature and pressure to convert the magnesium into magnesium hydroxide.

5. A process of manufacture of magnetic cores comprising the agitation of powdered magnetic material in contact with finely divided magnesium (vapour or powder) and subsequently treating the material with steam at an appropriate temperature and pressure to convert the magnesium into magnesium hydroxide.

6. A process of manufacturing magnetic cores comprising applying finely divided magnesium to powdered magnetic material, so as to form a coating thereon, moulding the material under pressure to the required shape, placing the moulded core in a container and treating the core, while so held, with steam at an appropriate temperature and pressure to convert the magnesium into magnesium hydroxide.

In testimony whereof we affix our signatures.

SYDNEY BECKINSALE.
HAROLD JOHN ALLCOCK.